Level 4 Exam

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The LEAGUE
of Amazing Programmers

1. Create a two dimensional array of Strings that has 10 columns and 4 rows.

2. Rewrite the following switch-statement with the same logic using an if/else block.

```
int x = new Random().nextInt(3);
switch(x){
    case 0:
        System.out.println("zero");
        break;
    case 1:
        System.out.println("uno");
        break;
    case 2:
        System.out.println("duce");
        break;
    default:
        System.out.println("uh oh");
        break;
}
```

3. Create an object of the Widget class that defines G as a BufferedImage.

```
public class Widget<G>{
      G memVar;
}
```

4. Consider the following enum:

```
enum Bracket{
      BRONZE, SILVER, GOLD, PLATINUM
}

Bracket brkt = getPlacement(); //implemented elsewhere
```

Write an if/else block that will print a different response based on the value of brkt.

5. Write a method called isEvenString that takes a String as a parameter and returns a boolean. It should return true if the string has an even amount of characters and false if it has an odd amount.

Example: `isEvenString("water"); //should return false`

6. What is printed when this code is run?

```
try {
        System.out.println("here");
        int x = 10/0;
        System.out.println("there");
} catch (Exception e) {
        System.out.println("nowhere");
}
```

7. Use encapsulation to protect the resolution member variable in the Graphics class below.
Make sure that the resolution cannot be set higher than 1000.

```
public class Graphics{
     int resolution;
```

```
}
```

8. What is the output of the following program when run?

```
public class Runner{
     public static void main(String[] args){
          class Parent{
               public Parent(){
                    System.out.println("Parent");
               }

               public void speak(){
                    System.out.println("Old");
               }
          }
```

```
class Child extends Parent{
    public Child(){
        super();
        System.out.println("Child");
    }

    public void speak(){
        super.speak();
        System.out.println("New");
    }
}


Parent par = new Parent();
par.speak();
Child child = new Child();
child.speak();
    }
}
```

9. The following is a matrix that represents the values of a 2D array printed out in row major order.

0	1	2	3
4	5	6	7
8	9	10	11

Complete the code below to properly define the size of the matrix.

```
int[][] matrix = new int[      ] [          ];
```

10. Write a method called countAlphaZed that takes a String and returns an int. It should return the total number of a's and z's in the String.

Example: `countAlphaZed("Zanzibar"); // should return 4`

11. What would be the output produced by the following code?

```
System.out.println("ONE\nTWO\nTHREE\tFOUR");
```

12. Complete the code below so that it will compile?

```
try{
    int x = Integer.parseInt(JOptionPane.showInputDialog("in"));
}
```

13. What is the output of the following program?

```
int[] vals = {1, 2, 3, 4, 5};
for(int i = 0; i < vals.length; i ++){
    vals[i] = vals[i] * vals[i];
}
System.out.println(vals[3]);
```

14. A window is displayed at 600 x 400 pixels. If a 10 x 10 grid was to be displayed in the window so that every cell of the grid is of equal size, what would be the width and height in pixels of each grid cell?

15. Add code to the Fort class so that it will compile without errors.

```
public abstract class Base
{
    abstract void setPerimeter(int w, int h);
}
public class Fort extends Base
{
    // Add code here



}
```

16. Complete the method below so that it inverts every value of the integer.
Example:
```
    int[] n = {2, -1, 45, -33};
    invertArray(n); // n is now equal to: {-2, 1, -45, 33};
```

```
public void invertArray (int[] arr)
{




}
```

17. What is the output when calling `mysteryNum(10); ?`

```java
public void mysteryNum(int n){
    if(n > 0){
        mysteryNum(n - 1);
    }
    System.out.println(n);
}
```

18. What are the contents of mtx after the following code segment has been executed?

```java
int[][] mtx = {{0, 1, 2}, {3, 4, 5}, {6, 7, 8}};
for(int i = 0; i < mtx.length / 2; i++){
    int[] t = mtx[i];
    mtx[i] = mtx[mtx.length - i - 1];
    mtx[mtx.length - i - 1] = t;
}
```

mtx = [   ][   ][   ]
      [   ][   ][   ]
      [   ][   ][   ]

19. What is printed?

```java
String water = "water";
String z = "";
for(int i = 0; i < water.length(); i++){
    z += water.substring(water.length() - 1 - i,
water.length() - i);
}
System.out.println(z);
```

20. Explain the error in the code below.

```
class Doctor{
      void doWork(){
            super.doWork();
            System.out.println("Doctor at work");
      }
}

class Pediatrician extends Doctor{
      void doWork(){
            System.out.println("Pediatrician at work");
      }

}

public void someMethod(){
      Doctor d = new Pediatrician();
      d.doWork();
}
```

How would you fix it so that calling someMethod() would print
```
      Doctor at work
      Pediatrician at work
```
without changing the code inside someMethod?